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THE RIGHT TO WORK AND FINDING WORK: THE INACCESSIBILITY OF PRIVATE AND PUBLIC SECTOR CAREER PORTALS

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ABSTRACT

The right to participation in society for people with disabilities is relatively well established in national and international law and convention (UNCRPD), and increasingly in social norms. These rights include the right to work.

The majority of job opportunities today are advertised and applied for almost exclusively online in digital form. In late 2017 we performed both automated testing of career sites against WCAG 2.0 and BITV standards and a multi-day detailed laboratory observation of visually impaired and blind testers applying for jobs across 10 German organisations in the public and private sectors. The tests note significant problems with the accessibility of the career sites, both in terms of standards compliance and practical use testing. This study illustrates the barriers that digital technologies can create for people with disabilities. This paper will highlight and classify these issues, explore their causes, and briefly suggest improvements for software developers, employers and regulators.

KEYWORDS

Accessibility; Recruitment; Software; Web; BITV

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1 Accessibility Study Of German Corporate Career

Various laws, treaties and regulations aim to address discrimination of people with disabilities. Today, the internet is the dominant channel for employers to advertise vacancies, and to engage with candidates. Recruiting software is now highly sophisticated.

This study examines the accessibility of the career sites of 7 large German multinationals and 3 Public Sector organizations, using both automated testing tools, and blind and visually impaired users using the websites.

2 The Right To Work

Article 27 of UNCRPD[1] obliges states to recognize the right of persons with disabilities to work, on an equal basis with others. (Fasciglione, 2015). Similar rights are created by EU Directive[2] and in national law, for example the AGG[3] and the BGG[4] in Germany. Additionally Article 3 of the German Constitution states that no person shall be disfavoured because of disability and Article 12 establishes occupational freedom. Social law in Germany aims to protect the rights of workers and those seeking work, and also specifically attempts to encourage employers to provide work for people with disabilities[5]. We examine whether technology supports or hinders that right to work.

3 Earlier Studies

While there have been various studies of website accessibility (Kuzma, 2010; Wentz *et al.*, 2014; Acosta-Vargas, Lujan-Mora and Salvador-Ullauri, 2016) and some on career sites, we were unable to locate any study of German corporate career sites. A study in the US investigated the accessibility and usability of job application websites for the blind (Lazar, Olalere and Wentz, 2012). This study did not just test for standards compliance, but it tested real world usability by having blind users conduct hands on applications. The results showed that less than 1/3 of the application attempts could be done without assistance.

4 Approach To Testing, Test Subjects And Test Design

Automated testing, while it is useful in picking up many accessibility errors, has many limitations. The most effective way to test for accessibility is to have testers who have the disability you wish to test against. In order to assess the websites as completely as possible, and to explore the gap between automated testing assessment and actual user feedback, automated testing, screen recordings, a user survey, video interviews and direct observation were deployed.

4.1 LAB ASSESSMENT AND OBSERVATION

The SZS[6] at the Karlsruhe Institute of Technology provides assistance to visually impaired and blind students, and researches assistive technologies, and the testing took place in the SZS lab. 4 students volunteered for the testing. The testing was run over the course of 4 days in Nov./ Dec. 2017, with two students per session.

All screen activity and computer voice were recorded, and the authors attended all the sessions, took notes, asked questions and made video of the testers in action, and interviewed them at the end of the assessment.

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[1] United Nations Convention on the Rights of Persons with Disabilities

[2] Council Directive 2000/78/EC of 27 November 2000 establishing a general framework for equal treatment in employment and occupation

[3] Allgemeines Gleichbehandlungsgesetz. General Act on Equal Treatment.

[4] Behindertengleichstellungsgesetz. Equality for Persons with Disabilities Act.

[5] SGB IX: Rehabilitation und Teilhabe behinderter Menschen (Rehabilitation and Participation of Disabled People)

[6] www.szs.kit.edu Study centre for the visually impaired.

Name	Disability level	Assistive technology	Academic field	Academic degree
User 1	<5% view left	NVDA (screen reader)	Chemistry	Masters
User 2	15% view left	Zoomtext (magnifer)	Computer Science (FH)	Bachelors
User 3	Blind	NVDA/Braille	Computer Science (FH)	Bachelors
User 4	Blind	NVDA/Braille	Computer Science	Bachelors

Table 1. Background of users for lab test.

The choice of organizations was based organizations that the testers were curious to test, taken from a longer list of large German companies. For the public sector, a mix of large and smaller organizations were chosen. For the purposes of this publication, we have withheld the organization names.

The testers were asked to find a role that they would be potentially interested in applying for, for instance, student placement in the IT department, thesis assignment, or first level job.

4.1.1 KEY FINDING

None of the sites were completely accessible without some assistance. In some cases, the assistance was minimal, in others it involved actually taking control of the computer. Most of the private sector sites had many basic accessibility errors. Public sector sites were somewhat more compliant in terms of accessibility navigation and controls, but were sometimes overly complex from a generic usability perspective.

The descriptions below are based on the real time perceptions, frustrations and successes of the users, and a detailed analysis of the screen recordings. The high level WCAG 2.0 principles influenced the analysis (Perceivable, Operable, Understandable, and Robust).

4.1.2 FINDING THE CAREER AND JOB SITE

Rather than going to the corporate home page, and then searching through the menu for the ca-reer or jobs section, all the testers went to Google and searched on company name / jobs. In almost all cases this brought up the correct site as the first link on the google search, although in one case the user clicked onto an external job board which had bought the advert listing at the top of search result. The test users commented that they found Google search easier to navigate than trying guess menu names and navigation paths on the corporate website. No one used the website's own search bar to find the career page starting point.

4.1.3 SEARCH NAVIGATION

All sites had some navigational issues, but searching /narrowing down the selection was often very problematic. Several sites used maps for search navigation (fig. 1), these were generally inaccessible. For example, this high-level selection of the type of role was overly ornate (fig. 2), and without alt-text. To navigate this, the tester required sighted user assistance.

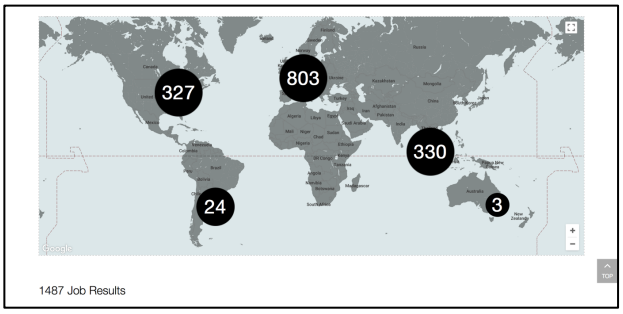

Figure 1. Map inaccessible for screen reader.

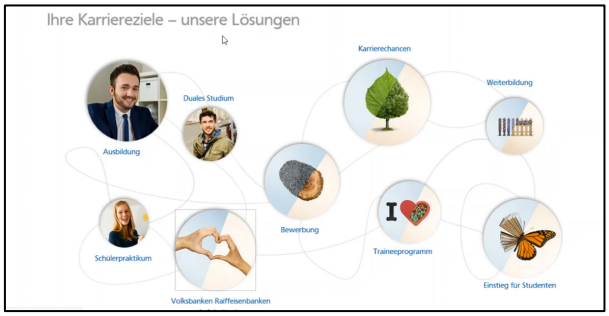

Figure 2. Pretty but awkward navigational metaphor.

4.1.4 PDFS FOR HELP, ETC.

When the test users realized that they needed to open a PDF, they all mentioned that PDFs are often a major accessibility challenge. This mirrors other research on PDF experience (Wild

and Craddock, 2016). A document describing the application process and flow was completely inaccessible to the screen reader. It read every letter out. All other PDFs they encountered were also difficult to read, as they were not formatted to be accessible. Typically, this meant that the whole document needed to be clicked through word by word, or even letter by letter. Most images in the PDFs lacked alt-text. For long documents such as privacy statements requiring acknowledgement, this was particularly problematic, and without sighted assistance, PDFs were a showstopper on several sites.

4.1.5 VERBOSITY OF TEXT AND IMAGES

Most of the career sites had a lot of marketing text/images, which a sighted person would skim over. Screen reader users don't have that opportunity to skim text, and when the text is both verbose and awkward to navigate past, frustration levels rise. Users who have to listen to sound of the screen reader appreciate concise marketing.

4.1.6 DIFFERING RESPONSES BY USER

The lab test illustrated every user is different; there is no standard blind user. The challenges, successes, frustrations were not precisely the same for the 4 users. Perceived factors influencing this included the nature and level of disability itself, knowledge of the recruitment process and corporate websites more generally, and choice of assistive technology and even browser. One user was particularly adept at working around navigation issues that other users were not able to solve quite so easily.

For example, in the case below (fig. 3) website navigation was seen as difficult by the blind users because of poor labelling and awkward tab sequence, but one user with visual impairment found the black and white contrast buttons easier to use with the screen magnifier.

On the other side blind users found the screen in fig. 4 easy to complete, as field names were directly noted in the field itself, making for simple and rapid navigation, however for partially sighted users, the light colouring made the screen illegible, even with strong magnification.

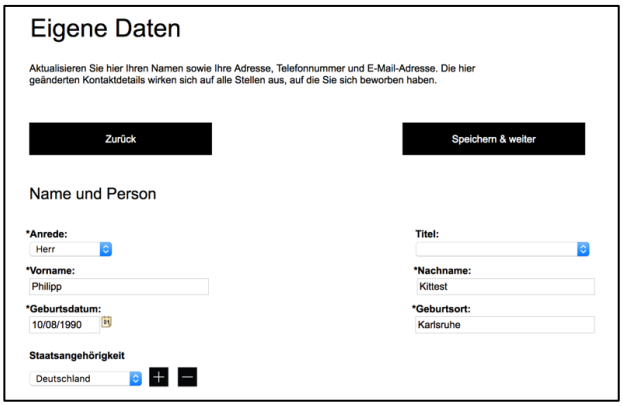

Figure 3. Good contrast example for visually impaired users, but blind users found the navigation awkward.

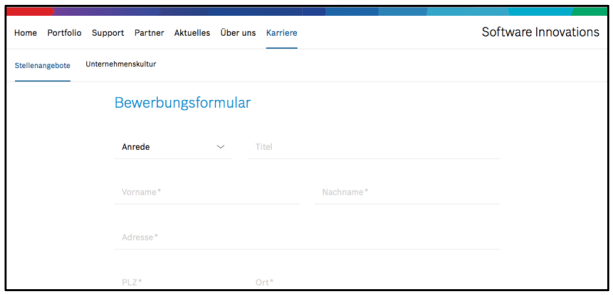

Figure 4. Screen contrast poor but good field navigation.

4.1.7 DIVERSITY STATEMENTS, OR CERTIFICATIONS

We were not able to find any career site that advertised compliance with WCAG, either in the website impressum, or on the career site itself. Some career sites discussed accessibility in the context of their diversity behaviours, and highlighted their diversity credentials.

While most corporate sites have an extensive section on diversity, people with disabilities generally receive little or no mention. Public sector organizations were significantly better in providing information about accessibility obligations and also in terms of capturing disability information about the applicant.

4.1.8 STRUCTURED DATA AND EXCESSIVE COLLECTION

While there may be justification for some of the fields, others are clearly excessive. Several sites have very lengthy drop-down lists. This one caused a problem for the students, as the screen was labelled *Zeugnis* (reference), so they were expecting to upload their CV and degree type information, instead it was asking for industry specific certificate information. Without sighted assistance, the test subjects were not able to progress beyond this point (fig. 5). One public sector site the forms were overly complex, with excessive use of drop-down entries and somewhat cryptic codes. The relevance of the nobility table is highly questionable (fig. 6).

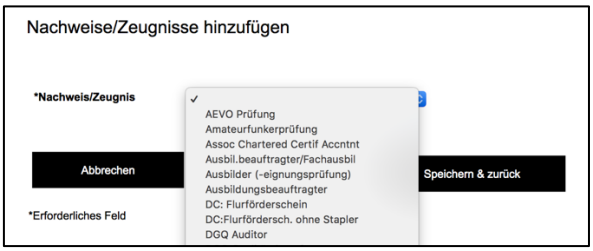

Figure 5. Lengthy drop-down list.

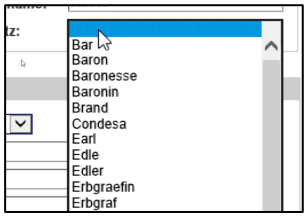

Figure 6. Nobility titles on the recruitment form.

This was even more problematic with job and education information, where the pull-down lists were long, and lacking intuitive search (fig. 7). While highly structured data makes for easy categorization by the recruiter, the effort for a disabled user was such that it required the help of sighted user to complete the fields. There were at least 10 such fields, some had several 100 items. The list of subjects was a pull down, meaning scrolling through 100s of entries.

Figure 7. List of study subjects.

4.1.9 EMBEDDED VIDEO

Embedding video, often using YouTube, is widely used, especially in the career portal stage. While these videos are an excellent way to inform and excite sighted applicants and candidates, clearly they are very little use to visually impaired or blind users. When video replaces other forms of communication, then it is actually a hindrance. All sites were haphazard in labelling videos with meaningful labels. In some cases the video played sound and music on opening the site, and in the background. This was very confusing and in one case discomforting for the tester. Additionally, most videos didn't have captions, which is not helpful for deaf or hearing-impaired users.

4.1.10 CAPTCHAS

Captcha made it very difficult for those not using a mouse to conclude the process without sighted assistance. The audio captcha is very difficult to follow, and provides limited feedback. It also scrambled languages.

4.1.11 FORM AND PROCESS NAVIGATION

On several sites tab order is not well thought through, and when combined with poorly labeled data fields, it makes data entry very laborious, error prone and frustrating. Some of the screens are very long with poor framing. On one site for instance, the tab order included the long list of subcompanies and images. In the course of the application, one user went through that list at least 10 times.

4.1.12 ERROR MESSAGES, POP UPS, AND DATE ENTRY

Several sites use pop ups to display new data entry screens, this is awkward navigationally, as the screen reader doesn't always know about the pop up. Pop up error messages are especially problematic if they are not accessible, as the user is then unaware of the error and how to address it. Several sites did not properly document radio buttons, so it was hard to figure out what one had clicked yes or no for.

Date handling is often problematic, with rich control calendars often requiring sighted intervention. Date fields require careful attention. In the case below (fig. 8), it was impossible for any of the testers to move beyond the calendar pop up without sighted assistance. At least 3 other sites had similar issues with date handling.

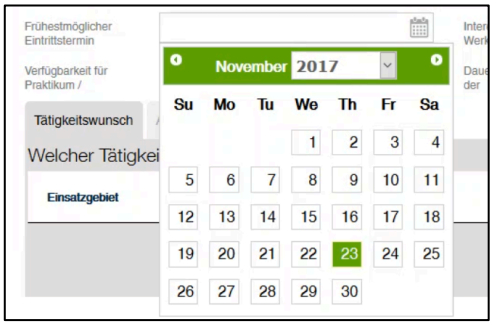

Figure 8. Calendar freezes screen reader.

4.2 AUTOMATED TESTING OF SITES

As well as the observational test with the users, the study tested the first page of career sites with an automated testing tool for BITV[7] and WCAG 2.0. The tool used was AChecker, as this is used regularly by the SZS for its testing. It's an open source tool, developed by the Adaptive Technology Research Centre at University of Toronto (Gay and Li, 2010). It is widely used, especially in the more recent testing research. See Vigo for a detailed benchmark of testing tools (Vigo, Brown and Conway, 2013). AChecker tests for multiple standards, for instance WCAG 1.0, WCAG 2.0, Section 508, BITV 1.0, and the Italian Stanca Act. AChecker identifies three types of problems (Sohaib and Kang, 2017).

- **Known Problems:** These are problems that must be fixed and have been identified as accessibility barriers.
- **Likely Problems:** These are problems that are likely to be fixed and have been identified as probable barriers.
- **Potential Problems**: These are problems that require a human decision for modifying or not to modify your webpage.

Rather than simply giving a pass or fail score, the tool provides a detailed explanation of the issue, suggesting fixes. The vast majority of errors were graphical images that were not labelled. Many of the images on these websites don't serve a particular critical purpose, but nevertheless, they should be labelled, and also avoided in navigation, when appropriate. The landing page with highest error count, had a relatively minor error, (e. g. use of italics) repeated in the background on many elements. This may impact text resizing for visually impaired users. On a bank site, there are a number of images used for navigation, and these are identified by the tool as being without alt text. These are more severe. In the lab test, this lack of alt text was a major navigation challenge for the testers, as these images were the springboard to other important parts of the site. For this research, we only tested the first page of the career site, not the complete process flow. Just testing the first page obviously does not give visibility into the complete process, but it is a useful start. The authors surmise that the further into the process the worse the accessibility standards compliance would be, given the greater complexity of the input screens, and the "Potemkin village" tendency of corporate and government websites. The automated test should not be seen as a

[7] BITV: Barrierefreie Informationstechnik-Verordnung. German Accessibility regulation, Established by BGG.

substitute for user testing, but they should be a key part of the website readiness assessment. At the very least, recruitment managers can use these tools themselves to ask questions of those responsible for website testing. Using the number of errors to rank sites is not accurate, as the severity of the errors is not assessed. It is clear that the testing of career sites for accessibility is haphazard at best. Most of the errors that the tool finds are very simple to repair. The tool is not able to pass judgement on broader usability, but it is effective at highlighting failing based on the standards.

4.2.1 AUTOMATED PDF TESTING

Several of the career sites we examined make use of PDFs, for the reasons discussed above. Several PDF files were selected from the test organizations. They were tested against the ISO-14289:2008 standard, otherwise known as PDF / UA-1. The tool used to do the testing is an open source tool called PAC3.[8] The tool provides a detailed report, defining and describing the errors in the documents. All PDFs that the testers engaged with in the lab were either inaccessible or awkward to access. On viewing the automated test results, it illustrates little effort is given to PDF accessibility design or testing before posting on the career sites. While not all career sites made use of PDF's, most did, and none were easily accessible. Today it is simple to create accessible PDF's, there are tools with templates to guide content writers to develop accessible content, and there is a growing array of tools to test and correct accessibility errors. The failing on PDF accessibility is hard to justify, and the author suspects that the PDF's are written by HR, and not checked against standards when saving. This is a relatively trivial process with content tools today.

5 FIXING THE PROBLEM

Significantly improving accessibility requires action from multiple stakeholders.

Developer knowledge and attitude: Software developers and product management require accessibility training (Ladner and May, 2017)

Design methods: Mainstream universal design into software. For instance, Design Thinking is currently not inclusive. Accessibility by design and default (Abascal *et al.*, 2016).

Tooling: Improving development tools, methodologies (Sánchez-Gordón and Moreno, 2014) and the standards themselves[9].

Inclusive hiring: Encourage more inclusive hiring in software development. Designing with, rather than merely for people with disabilities.

Buyer behaviour. Organizations that procure and commission career sites could place more pressure on software developers to provide up to date VPATs[10] and hold them to them (DeLancey, 2015).

Applying technology to the challenge. AI to improve accessibility. For instance, image recognition software can create meaningful alt-text descriptions (Wu *et al.*, 2017).

Regulatory clarity and the threat of sanction. European accessibility law is fragmented, and only sporadically enforced (Easton, 2012). In the US, ADA[11] claims have forced many organizations to improve web accessibility.

6 SUMMARY

Employers and software are failing to deliver Accessible recruitment.

Firstly, this research showed how this set of organizations have largely failed to deliver accessible recruitment for people with disabilities. The frustrating experiences of the testers highlights clearly the problem. Code can discriminate. The private sector organizations were

[8] http://www.access-for-all.ch/en/ *Schweizerische Stiftung zur behindertengerechten Technologienutzug.*

[9] It is beyond the scope of this paper to discuss the strengths and weaknesses of the WCAG standards.

[10] The Voluntary Product Accessibility Template.

[11] ADA. Am Americans with Disabilities Act of 1990 (42 U.S.C. § 12101)

typically poor, with limited regard for accessibility standards compliance. The public-sector websites were somewhat better, due in part to demands of German *Barrierefreiheit* (Accessibility) regulations. Secondly, many of the usability issues that made things very difficult for the testers, would also have been frustrating for the sighted user. Overly complex passwords, excessive use of structured data fields, awkward attachment handling, verbose marketing texts, for instance, would be irritating for any user. Fixing usability would help all users. Thirdly, fixing the many of these issues is not particularly difficult. The accessibility of the career sites would be improved with a more disciplined approach to Alt Text field labelling and tab navigation flow. Fundamentally improving accessibility in recruitment will require effort from software developers, employers, and regulators. It is not merely a software problem, but a reflection of broader societal failings of inclusion. While employers talk extensively of diversity, the reality of their corporate career sites illustrates the large gap between rhetoric and practice.

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